Effect of hyperlipidic diets on normal and abnormal aortic valves in the Syrian hamster: a preliminary study

Fernández M.C.[1,2], Moncayo-Arlandi J.[1], Soto M.T.[1], López-Unzu M.A.[1], Fernández B.[1,2], Durán A.C.[1,2]

[1]Department of Animal Biology, Faculty of Science, University of Málaga, Spain

[2]Biomedical Research Institute of Málaga (IBIMA), University of Málaga, Spain

Bicuspid aortic valve (BAV) is the most frequent human congenital cardiac malformation. It frequently becomes stenotic due to calcification by an atherosclerosis-like process. Hyperlipidic diets have been classically used to induce atherosclerosis in laboratory animals, including Syrian hamsters. The aim here is to evaluate the effect of hyperlipidic diets in hamsters having different incidence of BAVs.

We used a unique inbred strain of Syrian hamsters with a high (~40%) incidence of spontaneous BAV, morphologically similar to that in man, another inbred strain with a low (~4%) incidence of BAV, and an outbred, second control line, acquired from Charles River Laboratories. Three experimental groups were fed with standard diet supplemented with 2% cholesterol plus 15% butter during six weeks. In parallel, three control groups were fed with unmodified standard diet.

Hyperlipidic diets induced lesions in the aortic valve and ascending aortic wall, i.e. subendothelial lipid deposits, valve sclerosis, and neo-intima in the aorta. We performed a preliminary, qualitative, comparative study of the lesions associated with the different animal populations and valvular phenotypes.

Our results indicate that (1) the type and severity of the lesions varied among the three hamster populations, suggesting that genetic factors may be involved; (2) the aortic valve morphology seems not to determine the severity of the valvular lesions. We conclude that our hamster strain with high incidence of BAV is a promising animal model for studies on human aortic stenosis.

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